Roll No. LHR. _____ (To be filled in by the candidate) (Academic Sessions 2015 – 2017 to 2018 – 2020)

CHEMISTRY 219-(INTER PART – I) Time Allowed : 20 Minutes

Q.PAPER – I (Objective Type) GROUP – I Maximum Marks : 17

PAPER CODE = 6481

Note : Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1-1	The largest number of molecules is present in : (A) 5.4 g of N_2O_4 (B) 2.8 g of CO (C) 4.8 g of C_2H_6O (D) 3.6 g of H_2O
2	1.00 mole of SO_2 contains : (A) 6.02×10^{23} atoms of oxygen (B) 3.01×10^{23} molecules of SO_2 (C) 6.02×10^{23} molecules of SO_2 (D) 3.01×10^{23} atoms of sulphur
3	Solvent extraction is a separation technique used for the product, which is : (A) Non-volatile; thermally unstable (B) Volatile; thermally stable (C) Non-volatile; thermally stable (D) Volatile; thermally unstable
4	The deviation of a gas from ideal behaviour is maximum at : (A) – 10 °C and 5 atm (B) –10 °C and 2 atm (C) 100 °C and 2 atm (D) 0 °C and 2 atm
5	The order of effusion of NH_3, SO_2, $C\ell_2$ and CO_2 gases is : (A) $NH_3 > SO_2 > C\ell_2 > CO_2$ (B) $NH_3 > CO_2 > SO_2 > C\ell_2$ (C) $C\ell_2 > SO_2 > CO_2 > NH_3$ (D) $NH_3 > CO_2 > C\ell_2 > SO_2$
6	Density of ice is minimum at 4 °C due to : (A) Empty spaces in structure of ice (B) Tetrahedral shape of crystal of ice (C) Large bond lengths (D) Large bond angles
7	The solid which has no definite crystalline shape : (A) Sugar (B) Salt (C) Glass (D) Dry ice
8	Quantum numbers, which represents 2p orbitals are : (A) $n = 2, \ell = 1$ (B) $n = 1, \ell = 2$ (C) $n = 1, \ell = 0$ (D) $n = 2, \ell = 0$
9	The nature of positive rays in discharge tube depends upon nature of : (A) Anode (B) Cathode (C) Residual gas (D) Discharge tube
10	Nature of bonds in N_2 molecule is : (A) One sigma ; two pi bonds (B) Two sigma; two pi bonds (C) Two sigma; one pi bond (D) Three pi bonds
11	For HF molecule μ_{obs} is 1.90 D ; μ_{ionic} is 4.4 D. The percentage ionic character of HF molecule is : (A) 100 (B) 80 (C) 57 (D) 43
12	The amount of heat absorbed when one mole of gaseous atoms are formed from the element is called enthalpy of : (A) Formation (B) Reaction (C) Combustion (D) Atomization
13	For which of the following reaction, the unit of equilibrium constant (K_c) is reciprocal of molar concentration (M^{-1}) : (A) $3H_2(g)+N_2(g) \rightleftharpoons 2H_3N(g)$ (B) $2NO_2(g) \rightleftharpoons N_2O_4(g)$ (C) $H_2(g)+I_2(g) \rightleftharpoons 2HI(g)$ (D) $N_2(g)+O_2(g) \rightleftharpoons 2NO(g)$
14	18 g glucose dissolved in 90 g water has relative lowering of vapour pressure equal to : (A) $\frac{18}{90}$ (B) $\frac{1}{6}$ (C) $\frac{10}{51}$ (D) $\frac{1}{51}$
15	The salt dissolved in water forms a solution of pH greater than 7 : (A) $NaC\ell$ (B) Na_2CO_3 (C) $CuSO_4$ (D) $NH_4C\ell$
16	The oxidation state of oxygen in OF_2 is : (A) – 2 (B) – 1 (C) + 1 (D) + 2
17	The unit of rate constant is same as that of rate of the reaction having order : (A) Zero (B) One (C) Fractional (D) Two

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CHEMISTRY 219-(INTER PART – I) Time Allowed : 2.40 hours

PAPER – I (Essay Type) GROUP – I Maximum Marks : 68

SECTION – I

2. Write short answers to any EIGHT (8) questions : **16**

(i) Define relative atomic mass. Give two examples.

(ii) Calculate the percentage of nitrogen in NH_2CONH_2. (Atomic masses of C = 12 , N = 14 , O = 16 and H = 1)

(iii) Define gram formula giving one example.

(iv) Write two disadvantages of drying crystals in the folds of filter paper.

(v) Define distribution law about solvent extraction.

(vi) Derive Graham's law of diffusion from kinetic equation.

(vii) Give two reasons for deviation of real gases from ideal behaviour.

(viii) Write down two characteristics of plasma.

(ix) Derive the SI units of van der Waal's constant 'a'.

(x) Sea water has $5.65\times10^{-3}\,g$ of dissolved oxygen in one kg of water. Calculate the concentration of oxygen in sea water in parts per million (ppm).

(xi) Define molal boiling point constant. Give one example.

(xii) Define solubility curve. Name its two types.

3. Write short answers to any EIGHT (8) questions : **16**

(i) Why ice occupies 9% more volume than liquid water?

(ii) Why evaporation causes cooling?

(iii) Write two applications of liquid crystals.

(iv) Why heat of sublimation of I_2 is very high than other halogens?

(v) Write defects of Rutherford atomic model.

(vi) State Moseley law and also give its importance.

(vii) Why e/m value of cathode rays is equal to that of electron?

(viii) State Hund's rule.

(ix) How does buffer act?

(x) Give optimum conditions to get maximum yield of NH_3.

(xi) Justify that radioactive decay is always a first order reaction.

(xii) Describe auto catalysis with example.

4. Write short answers to any SIX (6) questions : **12**

(i) Why the radius of an atom can not be determined precisely?

(ii) Define ionization energy. Give its trend in periods and group of periodic table.

(iii) How electronegativity changes in a group?

(iv) Define coordinate covalent bond. Give one example.

(v) Explain that burning of candle is a spontaneous process. Justify.

(Turn Over)

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Roll No _____ (To be filled in by the candidate) **(Academic Sessions 2015 – 2017 to 2018 – 2020)**

CHEMISTRY 219-(INTER PART – I) Time Allowed : 20 Minutes

Q.PAPER – I (Objective Type) GROUP – II Maximum Marks : 17

PAPER CODE = 6482

Note : Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1-1	The largest number of molecules are present in : (A) 3.6 g of H_2O (B) 4.8 g of C_2H_5OH (C) 2.8 g of CO (D) 5.4 g of N_2O_5
2	The volume occupied by 16 g of CH_4 at STP is : (A) 2.24 dm^3 (B) 22.414 dm^3 (C) 1.3 dm^3 (D) 1.8 dm^3
3	Which one of the following compound is purified by sublimation : (A) Benzoic acid (B) SiO_2 (C) CS_2 (D) NaI
4	The unit millibar is commonly used by : (A) Meteorologists (B) Astronauts (C) Engineers (D) Dalton
5	The molar volume of CO_2 is maximum at : (A) S.T.P (B) 127 °C and 1 atm. (C) O °C and 2 atm. (D) 273 °C and 2 atm.
6	Hydrogen bonding is maximum in : (A) HI (B) HBr (C) HCℓ (D) H_2O
7	The molecules of CO_2 in dry ice form the : (A) Ionic crystals (B) Covalent crystals (C) Molecular crystals (D) Metallic crystals
8	The velocity of photon is : (A) Independent of its wavelength (B) Depend on its wavelength (C) Depend on its source (D) Depend upon its amplitude
9	Splitting of spectral lines when atoms are subjected to strong electrical field is called : (A) Zeeman effect (B) Stark effect (C) Photoelectric effect (D) Compton effect
10	The dipole moment of CO_2 is : (A) 0.95 D (B) 1.85 D (C) 1.61 D (D) 0 D
11	The type of hybridization in $BeC\ell_2$ is : (A) sp^3 (B) sp^2 (C) sp (D) dsp^2
12	The term that is not state function : (A) Enthalpy (B) Internal energy (C) Work (D) Volume
13	The pH of 10^{-3} mole dm^{-3} of an aqueous solution of H_2SO_4 is : (A) 3.0 (B) 2.7 (C) 2.0 (D) 1.5
14	Liquids which are practically immiscible : (A) $H_2O + C_6H_6$ (B) $H_2O + C_2H_5 - OH$ (C) $H_2O + HC\ell$ (D) $H_2O + CH_3 - O - CH_3$
15	The molal boiling point constant is the ratio of the elevation in boiling point to : (A) Molarity (B) Molality (C) Mole fraction of solute (D) Mole fraction of solvent
16	The oxidation state of Mn in $KMnO_4$ is : (A) + 7 (B) + 6 (C) + 2 (D) + 5
17	In zero order reaction, the rate is independent of : (A) Temperature of reaction (B) Concentration of reactants (C) Concentration of products (D) Nature of reactants